

SECTION 15110

VALVES

PART 1 GENERAL

1.1 SUMMARY

- A. Scope
 - 1. Provide valves with materials of construction and methods of fabrication, assembly, erection, testing and interim operation in compliance with the requirements specified herein and requirements of applicable codes and authorities having jurisdiction.
- B. Description Of Systems
 - 1. Refer to Division 15 Section "Aboveground Piping Systems" for description of systems and associated valves.
- C. Related Work Specified Under Other Sections
 - 1. Division 15 Section "General Mechanical Requirements."
 - 2. Division 15 Section "Aboveground Piping Systems."
 - 3. Division 13 Sections for Instrumentation and Control Work.
 - 4. Division 16 Sections for Electrical Work.

1.2 QUALITY ASSURANCE

- A. Refer to Division 15 Section "General Mechanical Requirements." for applicable requirements.

1.3 SUBMITTALS

- A. Refer to Division 15 Section "General Mechanical Requirements." for applicable requirements.

1.4 OPERATING AND MAINTENANCE PERSONNEL TRAINING

- A. Refer to Division 15 Section "General Mechanical Requirements." for applicable requirements.

1.5 PROJECT CONDITIONS

- A. Refer to Division 15 Section "General Mechanical Requirements." for applicable requirements.

1.6 GUARANTEE/WARRANTY

- A. Refer to Division 15 Section "General Mechanical Requirements." for applicable requirements.

PART 2 PRODUCTS

2.1 VALVES: GENERAL REQUIREMENTS

- A. Provide valves conforming to ASME/ANSI, API, CGA, NFPA, UL, Owner's Underwriter's, and MSS Standards, Class as applicable, to suit specified and indicated requirements, including applicable codes/standards, function, fluid materials compatibility and maximum pressure/temperature conditions to be potentially encountered.
- B. Integral Bypass Valves: Where specified or indicated and for 4" and larger, cast steel and forged steel body gate valves, in steam line (heating hot water line) service, fit with factory full-port sized and installed, forged steel, weld-end, globe bypass valves with minimum 500 Brinell stainless steel seat/plug and Schedule 80 hydraulically bent piping. Bypass valve sizes, respectively, shall be: 1/2, 3/4 and 1-inch for valves sized 4, 6 and 8, and 10-inch and larger.
- C. Valved Drains: Line valves, in all fluids risers, shall have integral to body or line fitted, 1/2 inch ball valved drain on upper side of valve for valves 6 inch and larger and 1/2 inch ball drain for valves smaller than 6 inches. Where necessary to indicated function or to match line materials, provide cast steel or forged steel valves with integral tapped boss valved drains using Schedule 80 nipple. Ball valves shall be full port, system pressure/temperature and material rated.
- D. Fit with chain operator (COP), manual valves sized 4 inch and larger, except dead-end location valves, in utility/equipment spaces and where indicated, which cannot be reached from operating level or position. Provide chain to within 4'-0" above operating level. Offset chains that fall in aisle-ways or over equipment to hang on hooks on nearest column or wall or otherwise secure for personnel safety.
- E. Extension Shafts: Provide, where indicated, extension shaft guided in not less than 2 places, to prevent damage to valve stem and leakage.
- F. Asbestos packing and gasket material is NOT ALLOWED.
- G. Fit system valves with lock-shields in compliance with OSHA, Owner Lock-Out Standards and additionally where specified or indicated.
- H. Where a valve is used for balancing, fit valve operator with adjustable memory stop.

2.2 GENERAL SERVICE VALVES

- A. General Requirements
 - 1. See Article VALVES: GENERAL REQUIREMENTS.

B. Class 125, Threaded, Bronze Gate (GA-1), Globe (GL-1), Angle (AN-1) And Check (CK-1) Thru 2 Inches

1. Type 1 Series: Bronze body and trim, rising stem, union bonnet; minimum rating 125 PSI at 353 degF WSP, 200 PSI at 100 degF CWP.

	<u>GA-1</u>	<u>GL-1</u>	<u>AN-1</u>	<u>CK-1</u>
Crane		1	----	1707
Hammond	IB 617	IB 440	IB 463	IB 904
Milwaukee	1152	502	504	509
Powell	2700	650		578
Stockham	B-105	B-16	B-216	B-319

* Composition disc seat.

** Teflon disc seat.

C. Class 125, Flanged, Iron Gate (GA-2), Globe (GL-2), Angle (AN-2), And Check (CK-2) 2-1/2 Inches And Larger

1. Type 2 Series: Cast iron body, bronze trim, rising stem, outside stem and yoke; minimum rating 125 PSI at 353 degF WSP, 200 PSI at 100 degF CWP.

	<u>GA-2</u>	<u>GL-2</u>	<u>AN-2</u>	<u>CK-2</u>
Crane	465-1/2	351	353	373
Hammond	IR 1140	IR 116		IR 1124
Milwaukee	F2885	F 2981		F 2974
Powell	1793	241		559
Stockham	G-623	G-512		G-931

D. Class 150, Threaded And Flanged, Bronze Gate (GA-3, 3A), Globe (GL-3,3A), Angle (AN-3,3A), And Check (CK-3,3A) Thru 3 Inches

1. Type 3, 3A Series: Bronze body and trim, rising stem, outside stem and yoke; horizontal swing; minimum rating 150 PSI at 366 degF WSP, 200 PSI at 100 degF CWP.

<u>Threaded</u>	<u>GA-3</u>	<u>GL-3</u>	<u>AN-3</u>	<u>CK-3</u>
Crane	431-UB	7TF***	17TF***	137**
Hammond	IB 629	IB 413T***	IB 454T***	IB 944
Milwaukee	1151	590**	595**	508
Powell	2714	150***	151***	560
Stockham	B-120	B-22T***	B-222T***	B-321
<u>Flanged</u>	<u>GA-3A</u>	<u>GL-3A</u>	<u>AN-3A</u>	<u>CK-3A</u>
Crane	429	----	----	----
Powell	1414G		----	
Stockham	----	B-40/49	----	B-342

* Stainless steel disc and seat.

** Composition disc seat.

*** Teflon disc

- E. Class 300, Flanged, Steel Gate (GA-7), Globe (GL-7) Angle (AN-7), And Check (CK-7), 2-1/2 Inches And Larger

1. Type 7 Series: Cast steel body and hard alloy seat trim; minimum rating 300 PSI at 800 degF WSP, 740 PSI at 100 degF CWP. Outside stem and yoke; flexible wedge for gate valves.

	<u>GA-7</u>	<u>GL-7</u>	<u>AN-7</u>	<u>CK-7</u>
Crane	33-XU	151-XU		159-XU
Powell	3003N	3031	3033	3061
Stockham	30-OF-U	30-GPF-U	----	30-SF-U
Velan	F1064C-02TY	F1074C-02TY		F1114C-02TY

- F. Class 800, Threaded And Socket Weld, Forged Steel Gate (GA-8, 8A), Globe (GL-8, 8A), Angle (AN-8, 8A), And Check (CK-8, 8A) Thru 2 Inches

1. Type 8, 8A Series: Minimum rating 800 PSI at 850 degF WSP, 2000 PSI, at 100 degF CWP; forged steel body and hard alloy seat trim; stainless steel stem; outside stem and yoke.

<u>Threaded</u>	<u>GA-8</u>	<u>GL-8</u>	<u>AN-8</u>	<u>CK-8</u>
Bonney-Forge	HL-14	HL-31	----	HL-41
Velan	S2054B-02TY	S2074B-02TY		S2034B-02TY
Vogt	12111	12141	1971	701 (Ball Horz) 54853 (Ball H or V)
(RP&C	F-56	F-80	----	----
(Hancock-Dresser	950 thru 3"	5505	5510S	55805)
<u>Socket Weld</u>	<u>GA-8A</u>	<u>GL-8A</u>	<u>AN-8A</u>	<u>CK-8A</u>
Vogt	SW12111	12141	SW-1971	SW-701 (Ball H) SW-54853 (Ball H or V)
(RP&C	F-57	F-81	----	----
(Hancock-Dresser	950W	5500W	5510W)	

- G. Type GL-11: Needle, Threaded

1. Bar stock carbon steel body, threaded end with Type 303 or 416 stainless steel valve stem, fine thread stem, Teflon packed; minimum rating 4000 PSI at 100 degF WOG.
2. EEP/Fig 1900 (1/4 thru 1 inch)
3. RP&C Fig 1040/Tee Handle (1/8 thru 1 inch)
4. Trefice Fig 740-5

2.3 BALL VALVES

- A. General Requirements

1. See Article VALVES: GENERAL REQUIREMENTS.
2. Valves shall be suitable for bi-directional service.
3. Where specified and where required by applicable codes or authorities having jurisdiction, provide valves with: special cleaning; Firesafe construction per API 607; integral anti-static grounding per NFPA.
4. Provide valve stem extension for valves which are insulated in Chilled Water Systems and where handle temperature could exceed OSHA 150 degF limits.

5. Manual operators shall be safety oval type for valves thru 3 inches and enclosed gear handwheel type for valves 4 inches and larger, except where chain operators are additionally required. Submit samples of proposed safety oval handles and insulation stand-off handles.
 6. Provide ball valves with “dead-man” spring return handles, dust cover with chain, center tap drain, OSHA automatic pressure drain and “pad-lock” features where indicated.
- B. Type BA-1: Class 150, Threaded, 2-Piece All Bronze
1. Minimum rating 150 PSI at 366 degF WSP, 400 PSI at 100 degF CWP; brass or bronze 2-piece body and ball; reduced port; TFE seats and seals; brass or bronze trim; threaded end connections.
 - a. Neles/Jamesbury “Clincher Type 2000” (1/4 thru 2 inches). Size 21-1100TT-0.
 - b. Smith (1/4 thru 2 inches) 0125-size.
 - c. PBV, Series 5324.
- C. Type BA-2: Class 150, Threaded And Socket Joint, 3-Piece Bronze
1. Minimum rating 150 PSI at 366 degF WSP, 300 PSI at 100 degF CWP; bronze 3-piece body and ball; full or reduced port as specified; 30 or 60 degree V-port where indicated; 3-way ported where indicated; TFE glass or Type 316 stainless reinforced seats, and TFE seals; bronze or Type 304 or 316 stainless trim; threaded and socket joint end connections, anti-static grounded for hydrocarbon systems and where specified.
 - a. PBM “SP Series” (3/4 thru 4 inches):
 - b. Worcester “Miser”* (1/4 thru 2 inches):
 - 1) Threaded. size-4-1-6-RT-SE (2-way) size-T-4-1-6-T-SE (3-way)
 - 2) Socket Joint. size 4-1-6-RT-TE.
- *316 Type stainless ball; V-port source .
- c. Conbraco/Apollo. (3/8” thru 2”)
 - 1) Threaded: 82-140 Series.
 - 2) Socket Joint: 82-240 Series.
- D. Type BA-2A: Class 150, Flanged, 3-Piece Bronze
1. Same as Type BA-2, except flanged ends and full port.
 - a. PBM “SP Series,” Full Port, (1 thru 4 inches). SP-B-size code-F-15-2.
- E. Type BA-2B: CWP 300 PSI, Threaded And Socket Joint, 3-Piece Bronze
1. Minimum rating 300 PSI at 100 degF CWP; bronze 3-piece body and ball; reduced port; virgin TFE seats and seals; bronze trim; threaded and socket joint end connections.
 - a. PBM “SS Series” (3/4 thru 4 inches):
 - 1) Threaded. SS-B-size code-S-2.
 - 2) Socket Joint. SS-B-size code-SJ-2.
 - b. Worcester “Miser” (1/4 thru 2 inches):
 - 1) Threaded. size-4-1-1-T-SE.
 - 2) Socket Joint. size-4-1-1-T-TE.
 - c. Apollo:
 - 1) Threaded. 82-100 Series
 - 2) Solder Joint. 82-200 Series

- F. Type BA-4C: Class 150, Flanged, Ferrous
 - 1. Minimum rating 150 PSI at 366 degF WSP, 275 PSI at 100 degF CWP; ferrous 1 or 3-piece body; full or reduced port; TFE glass or Type 316 stainless filled seats and TFE seals; Type 316 stainless ball and trim; flanged end connections.
 - a. Neles/Jamesbury "Type 5150" (1/2 thru 4 inches). size-5150-31-22-36-MT; "Type 7150" (3 inch and larger) size-7150-31-2200 TT.
 - b. PBM "AN Series", Full Port (1 thru 6 inches). AN-E-size code-F-15-2.
 - c. Worchester (1/2 thru 10 inches). size-51-4-6-R-T-150.
 - d. Apollo (1/2 thru 10 inches). 88A-140 Series.
- G. Type BA-9: CWP 150 PSI, Threaded, Socket Weld And Flanged, PVC Or CPVC
 - 1. Minimum rating 150 PSI at 73 degF CWP; TYPE 1, GRADE 1 PVC or TYPE 4, GRADE 1 CPVC; true union body; TFE seats and Viton seals.
 - a. Asahi/American True Union. Threaded, Socket or Flanged (1/2 thru 6 inches).
 - b. Chemtrol-Nibco True Union. Threaded, Socket or Flanged (1/2 thru 3 inches).
 - c. Colonial, "Full Block True Union" Threaded, Socket or Flanged (1/2 thru 6 inches).
 - d. Hayward True Union. Threaded, Socket or Flanged (1/2 thru 4 inches).
 - e. Spears.

2.4 BUTTERFLY VALVES

- A. General Requirements
 - 1. See Article VALVES: GENERAL REQUIREMENTS.
 - 2. Lever operator, minimum nine position for valves thru 3 inches; lubricated enclosed screw or gear handwheel/chainwheel operator for valves 4 inches and larger. Chainwheel operator shaft shall be sized to preclude bending. Chains shall be galvanized. Tapped lug and flanged valves shall be guaranteed for bubble-tight closure at rated pressure and temperature with one pipe flange removed. For valves requiring insulation provide extended neck suitable for insulated service. Provide linkage with clevis-ends, screw/locknut position adjustment capability where 3-way valves are indicated. Where operator shaft is parallel to valve stem, provide 1:1 miter gear box integral to worm gear operator.
 - 3. Gear Actuators: Provide for all valves sized 4 inches and larger. For valves sized 30 inches and larger, provide gear ratio requiring less than 90 ft. lb. torque input and not more than 6-1/2 turns to open to produce tight closure output torque under design operating conditions.
- B. Type BF-1: CWP 150 PSI, Cast Iron Lug Body, Buna-N Lined, Bronze Disc, Heavy Duty Thru 36 Inches
 - 1. Heavy industrial duty cast iron lug body; EPDM or Buna-N removable liner; Type 316 solid one-piece stem; reinforced TFE bushings sealed from service media; bronze or aluminum-bronze disc; minimum bubble-tight rating 150 PSI at 180 degF. Provide specified tapped/MSSSP-44 flanged valves in sizes 30 inches and larger or at CONTRACTOR'S option, flanged AWWA C-504 Class 150 equivalent.
 - a. Bray Controls, Series 31 (2 thru 20 inches), Series 35/36 (24 thru 54 inches.)
 - b. Center Line Series 200; aluminum-bronze disc,. (2 thru 30 inches).

- c. DeZurik “BRS Series”; bronze disc, Teflon coated stainless steel or TFE filled bushings tap-flanged in sizes 30” and larger.
- C. Type BF-2: AWWA Class 150B, Flanged, Elastomer Lined Thru 48 Inches
 - 1. Drilled flange cast iron body valve shall be in conformance with AWWA C-504-80, CLASS 150B for Short Body Flanged Valves; EPDM or Buna-N seat and seals; Type 304 one-piece stainless steel stem; Nylon, glass filled TFE or Teflon coated steel bushings, bronze or ductile iron disc with stainless steel edge; Minimum bubble tight rating 150 PSI at 180 degF.
 - a. Crane “AWWA Series”; bronze disc, filled TFE bushings (3 thru 12 inches). Model 27F-BRB.
 - b. Pratt “AWWA Series”; bronze disc, Nylon bushings (3 thru 20 inches).
 - c. Pratt “Triton Series”; ductile iron with stainless steel edged disc, TFE filled bushings (24 to 48 inches).
- D. Type BF-4: Class 150, High Performance Carbon Steel Lug, Type 316 Stainless Steel Disc, Teflon Seat Thru 36 Inches
 - 1. Carbon steel lug or tapped flange body and retainer; Type 316 stainless steel disc, single-piece stem, top and bottom bushings, adjustable packing gland, fasteners, and miscellaneous trim; Teflon/stainless steel packing, seals. ANSI CLASS 150; minimum rating 150 PSI at 363 degF WSP, 285 PSI at 100 degF CWP; (ANSI/FCI 70.2 Class IV maximum leakage.)
 - a. Bray/McCannalok, Series 41
 - b. DeZurik (2 thru 36 inches). “BHP” - Series.
 - c. Durco “Big Max Series” (3 thru 30 inches). BX2L Series.
 - d. Grinnell “Hi-Seal” Series.(2 thru 48 inches) S15L-1132.(LMS 4-18-97)
 - e. Xomox “Pliaxseal Series” (3 thru 48 inches). 811-B-6-1.
 - f. Neles Jamesbury “Wafer-Sphere” 815L Series.
 - g. Milwaukee, HP Series.
 - h. ABZ, 400 Series.

2.5 CHECK VALVES

- A. General Requirements
 - 1. See Article VALVES: GENERAL REQUIREMENTS.
- B. Type CK-15: Class 125, Threaded And Flanged, Cast Iron, Non-Slam, Silent, Thru 24 Inches
 - 1. Minimum rating 150 PSI at 100 degF CWP; cast iron globe body and bronze and stainless steel trim, center-guided poppet-disc, plugged drain. FM approved where required.
 - a. Apco Valve and Primer Corp.
 - 1) Flanged Fig 600 Series.
 - b. Combination Pump and Valve (CPV):
 - 1) Threaded. No. 34 (1/2 thru 2 inches).
 - 2) Flanged. No. 20D (6 thru 24 inches), 125 PSI at 100 degF CWP.
 - c. Mueller Steam Specialty:
 - 1) Threaded. No. 203-BP (1/2 thru 2 inches).

- 2) Flanged. No. 105-AP (2 thru 24 inches).
- d. Val-Matic Valve and Manufacturing:
 - 1) Flanged. Fig. 1800 Series ANSI 125 (2-1/2 thru 42 inches).
- e. Milliken

*All threaded end valves are 300 PSI CWP pressure rated only.

- C. Type CK-15F, Foot Valve And Suction Strainer
 - 1. Minimum rating 150 PSI at 70 degF, PVC true union body, PVC ball check and C.V. seat carrier, EPDM seats and seals, socket outlet connection. Fit with PVC foot valve screen housing assembly.
 - a. Chemtrol-Nibco, TUBC.
 - b. Asahi/American.
 - c. Colonial
 - d. Hayward.
 - e. Spears.
- D. Type CK-18: CWP 150 PSI, Wafer, Non-Slam, Split Disc Thru 48 Inches
 - 1. Minimum rating 150 PSI at 100 degF CWP; cast iron body, bronze or aluminum bronze discs, stainless steel trim, Buna-N seats and seals.
 - a. APCO "9000 Series" (2 thru 42 inches). 9-0-size-A-R-1-F.
 - b. TRW "Mission":
 - 1) (2 thru 5 inches). K-12-H-M-P.
 - 2) (6 thru 48 inches). G-12-H-M-P.
- E. Type CK-30: Class 150 Flanged Cast Steel 2 Thru 10 Inch
 - 1. Minimum rating 285 PSI at 100 degF, Class 150 flanged cast steel body, TYPE 304 pulsation dampening, stable, center-guided, stainless steel disc/trim (with) (BUNA-N) (Teflon) (soft seat).
 - a. Durabla (215-363-8900) PDC Series.
- F. Type CK-34: Flanged Body, Elastomer Sleeve, Pinch Check Assembly Thru 20 Inches
 - 1. Minimum rating 50 PSI at 70 degF CWP, cast iron bodyBuna N elastomer normally closed sleeve, pinch check valve assembly designed for not less than 50 PSI back pressure.
 - a. Red Valve "Series 39".

2.6 NEEDLE VALVES

- A. Type ND-1: Needle, Threaded
 - 1. Bar stock carbon steel body, threaded end with Type 303 or 416 stainless steel valve stem, fine thread stem, Teflon packed; minimum rating 4000 PSI at 100 degF WOG.
 - a. EEP/Fig 1900 (1/4 thru 1 inch)
 - b. RP&C Fig 1040/Tee Handle (1/8 thru 1 inch)
 - c. Trerice Fig 740-5

2.7 PLUG VALVES

A. General Requirements

1. See Article VALVES: GENERAL REQUIREMENTS.
2. Valves thru 3 inches shall have lever operator. For larger valves provide enclosed gear handwheel operators. Provide chainwheel fitted operators where required.
3. Where specified and where required by authorities having jurisdiction, provide valves with firesafe construction per API 607; integral anti-static grounding per NFPA.
4. For TYPE PL-2 valves, deliver to OWNER, sealant injection tool and spare sealant.

B. Type PL-1: Eccentric Plug

1. Ferrous or bronze bodies with screwed ends in sizes 2 inches and smaller; flanged ferrous bodies in sizes 2-1/2 inches and larger. Nonferrous plug with elastomer seals or elastomer coated plug. Full bore for sizes 6 inch and larger. Plug and seal elastomer, manufacturer's standard for fluid system media and temperature. Fit valves with "memory" device or mechanism to permit valve to fully close but limit opening to preset point. Rated not less than 175 PSI at 225 degF.
 - a. DeZurik "Series 100". Fig. 118 to 121.
 - b. Homestead "Ballcentric Series".

C. Type PL-3A: Non-Lube Ferrous With Type 316 Stainless Plug With Teflon Sleeve

1. Minimum rating 250 PSI at 100 degF CWP; ferrous body; Type 316 stainless plug; PTFE sleeve; Type 302, 304 or 316 stainless trim. Provide API 607 firesafe seals (anti-static) construction where specified or required by code/authorities having jurisdiction.
 - a. Screwed 1/2 thru 2 inches SMG Permaseal
 - b. RF Flanged 1/2 thru 6 inches SMG Permaseal
 - c. Screwed 1/4 thru 2 inches Durco G432
 - d. RF Flanged 1/2 thru 14 inches Durco G411
 - e. Screwed 1/2 thru 2 inches Tufline 066
 - f. RF Flanged 1/2 thru 12 inches Tufline 067/EG
 - g. Screwed 1/4 thru 2 inches Grinnell 152
 - h. RF Flanged 1/2 thru 12 inches Grinnell 152 .

2.8 SPECIAL SERVICE VALVES

A. General Requirements

1. See Article VALVES: GENERAL REQUIREMENTS.

B. CHW System Balancing And Measuring Valves

1. *Balancing valves [D]*: Provide combined shut-off, balancing valve, and flow indicator.
 - a. ITT Bell & Gossett "Circuit Setter".
 - b. Taco.
 - c. Griswald.
 - d. Preso Industries.
 - e. Armstrong.
 - f. Tour and Anderson.

C. Pressure Relief Safety Valve - Water (PRSV)

1. *PRSV [D,P]*: Poppet style, self-contained pressure relief valve. Valve body shall be bronze, cast iron or forged steel to suit the service conditions.
2. Rate ASME Listed pressure relief valves for the pressure of the high-pressure side, and size for the full installed capacity of the low pressure side of the regulating station. Factory set valve at not more than 20% above low side pressure. Furnish seat material suited for the service.
 - a. Ashcroft.
 - b. Consolidated.
 - c. McDonnell and Miller.
3. For potable water supply, set to operate at pressure as indicated.
 - a. Contramatics-Watts "10XL8".
 - b. Cla-Val "No. 50 Series".

D. Pump Control Valve (PCV)

1. *PCV [D,P]*: Provide diaphragm actuated, single seated, hydraulically operated globe type valve. Valve shall have two operating chambers sealed from each other by a flexible, synthetic rubber, fully supported diaphragm. Valve disc shall be resilient, with a rectangular cross section, and shall be retained on three sides. Control of valve operation shall be by means of an externally mounted, four-way solenoid pilot valve. Self cleaning strainers shall be used to protect the control system. Valve shall utilize line valve to fully open from full closed position over two minute span. On de-energizing of solenoid, valve shall return to full closed position over two minute span. Valve shall be equipped with a built-in lift type check feature to prevent reverse flow. Valve shall operate independently of the solenoid control.
 - a. Cla-Val, Model 60-11.

E. Safety Relief (SRV)

1. *TYPE SRV-(1) [P]*: For compressed air service.
 - a. Valves shall conform to ASME Unfired Pressure Vessel Code SECTION VIII and capacities shall be certified by NBBPVI stamp.
 - b. Size for required capacity and pressure, set-point for each application 10% or 10 PSI greater than operating pressure, 10% pressure accumulation at maximum flow (90% of theoretical capacity).
 - c. Valves in sizes 2 inches and under shall have threaded or flanged connections and valves 2-1/2 inches and larger shall have integral to body or fitted flanged inlet and outlet connections.
 - d. Valve body and trim materials shall be bronze, cast iron, cast steel, wrought steel or stainless steel to match fluid piping system service corrosion conditions.
 - 1) Spence.
 - 2) Consolidated Div. of Dresser Industries.
 - 3) O.C. Keckley Co.
 - 4) Kunkle.
 - 5) Nicholson.

PART 3 EXECUTION

3.1 GENERAL

- A. Execute the WORK in compliance with Division 15 Section "General Mechanical Requirements."
- B. Refer to Division 15 Section "Aboveground Piping Systems" for additional requirements.
- C. General Service Valve Locations
 1. Locate shut-off valves to permit isolation of system mains, branches and risers, equipment and piping specialties, from the balance of each connected piping system, without loop or system shutdown. Locate system sectionalizing and equipment isolation valves to permit safe shutdown and convenient maintenance or drainage of equipment without moving equipment.

END OF SECTION

Revision History	
Date	Rev. No.
A	0
B	0
C	0
D	0
E	0
F	0
02-19-09	0

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